

# Monthly Marine Biotoxin Report

April 2004

Technical Report No. 04-16

## INTRODUCTION:

This report provides a summary of biotoxin activity for the month of April 2004. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

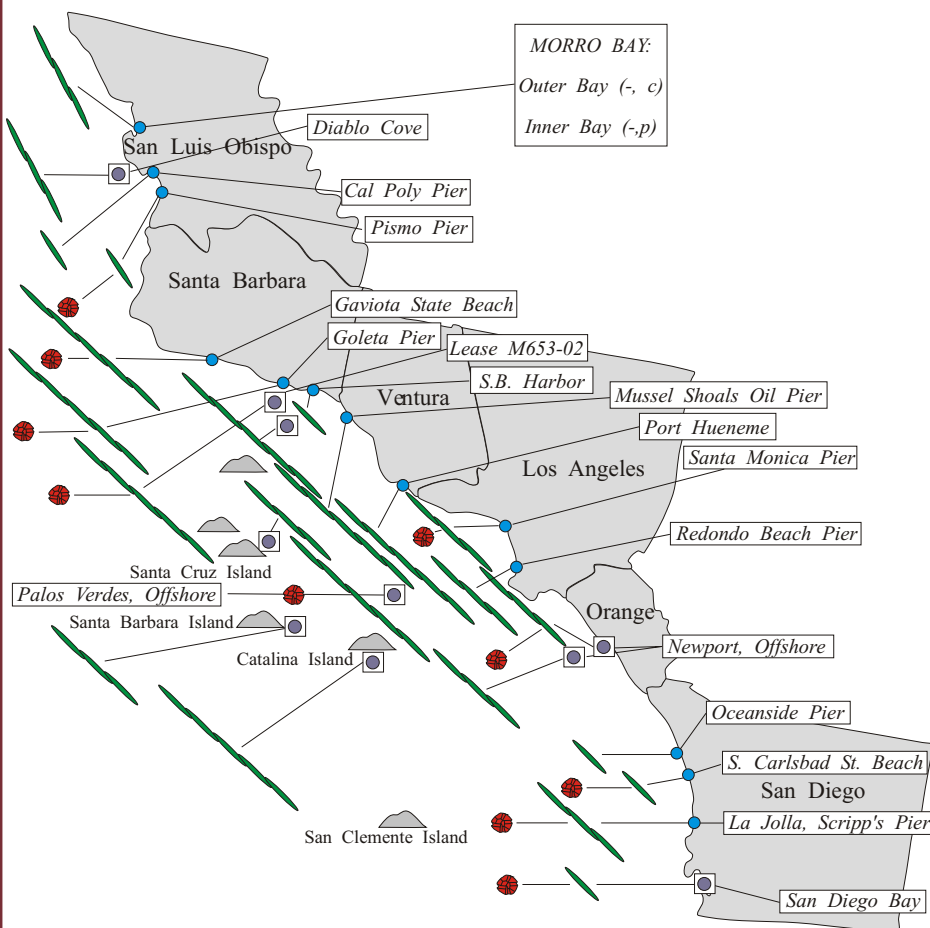
### Southern California Summary:

#### Paralytic Shellfish Poisoning

*Alexandrium* distribution remained similar to observations in March (Figure 1). However the relative abundance of this dinoflagellate

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during April, 2004.



### Relative Abundance of Known Toxin Producers

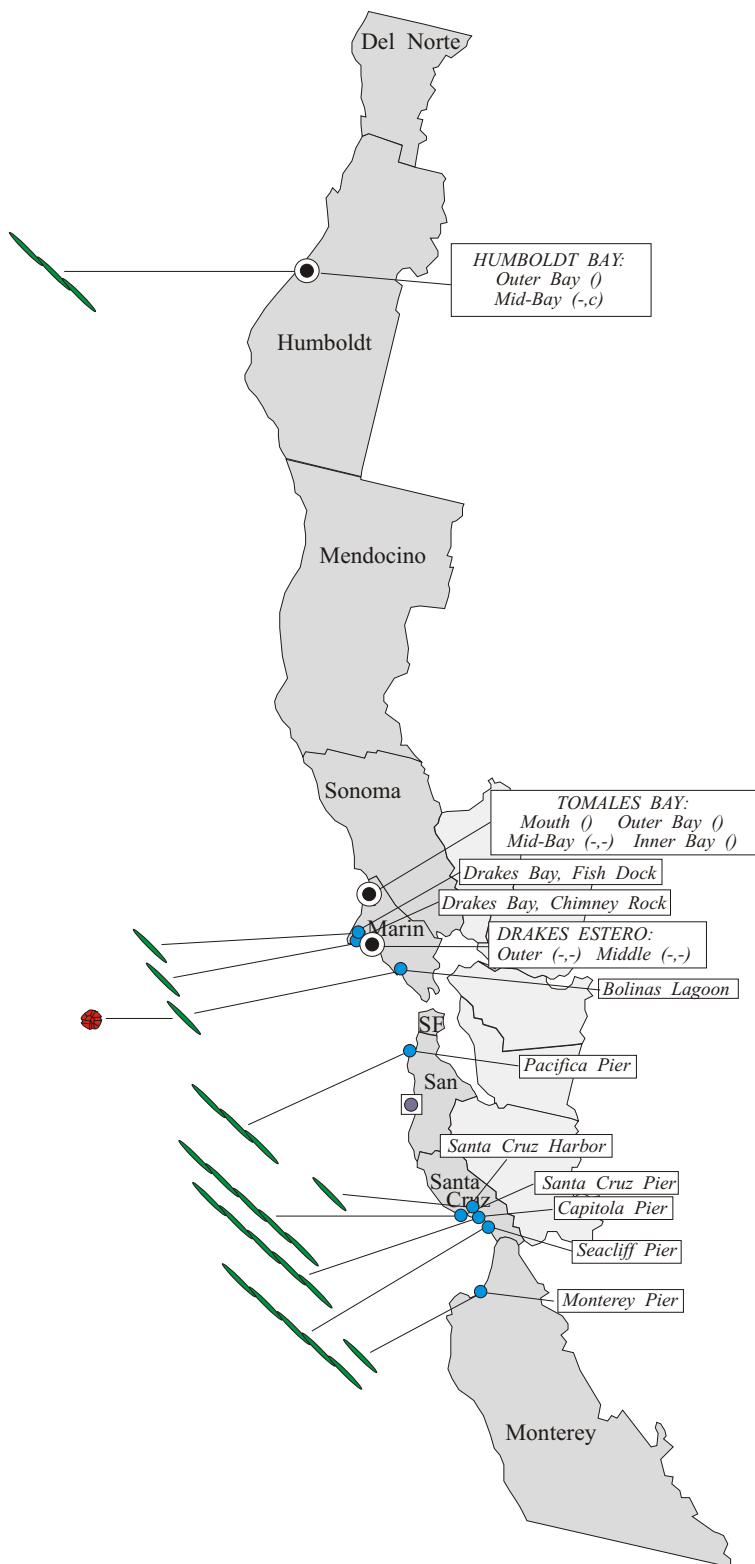
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

#### MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:  
(a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.  
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during April, 2004.



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species decreased in most locations.

The high concentrations of PSP toxins detected in mussels from the sentinel station at the Cal Poly Pier in Avila on March 24 (535 ug) and March 31 (217 ug) remained elevated on April 6 (214 ug). By April 14 the concentration of toxins at this site had decreased to 48 ug. Low concentrations of PSP toxins were also detected in mussels from Ventura, Los Angeles, and San Diego counties (Figure 3).

### Domoic Acid

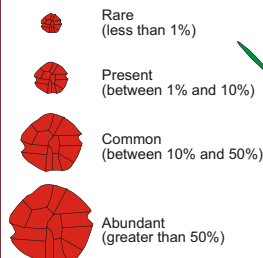
*Pseudo-nitzschia* was observed along the entire Southern California coast during April. The relative abundance of *Pseudo-nitzschia* increased significantly at most sites in this region (Figure 1).

The low levels of domoic acid detected in Santa Barbara County at the end of March continued through April. Toxin levels peaked by the third week of the month, reaching 87 ppm and 26 ppm in mussels and oysters, respectively, from an offshore aquaculture lease. Mussels from Goleta Pier also contained 20 ppm of domoic acid at this time. By April 12 this toxin was detected in low levels in mussels and razor clams collected by the Department of Fish and Game (DFG) at several sites in San Luis Obispo County.

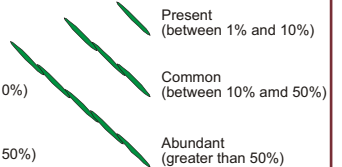
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### Relative Abundance of Known Toxin Producers

#### Alexandrium Species



#### Pseudo-nitzschia Species



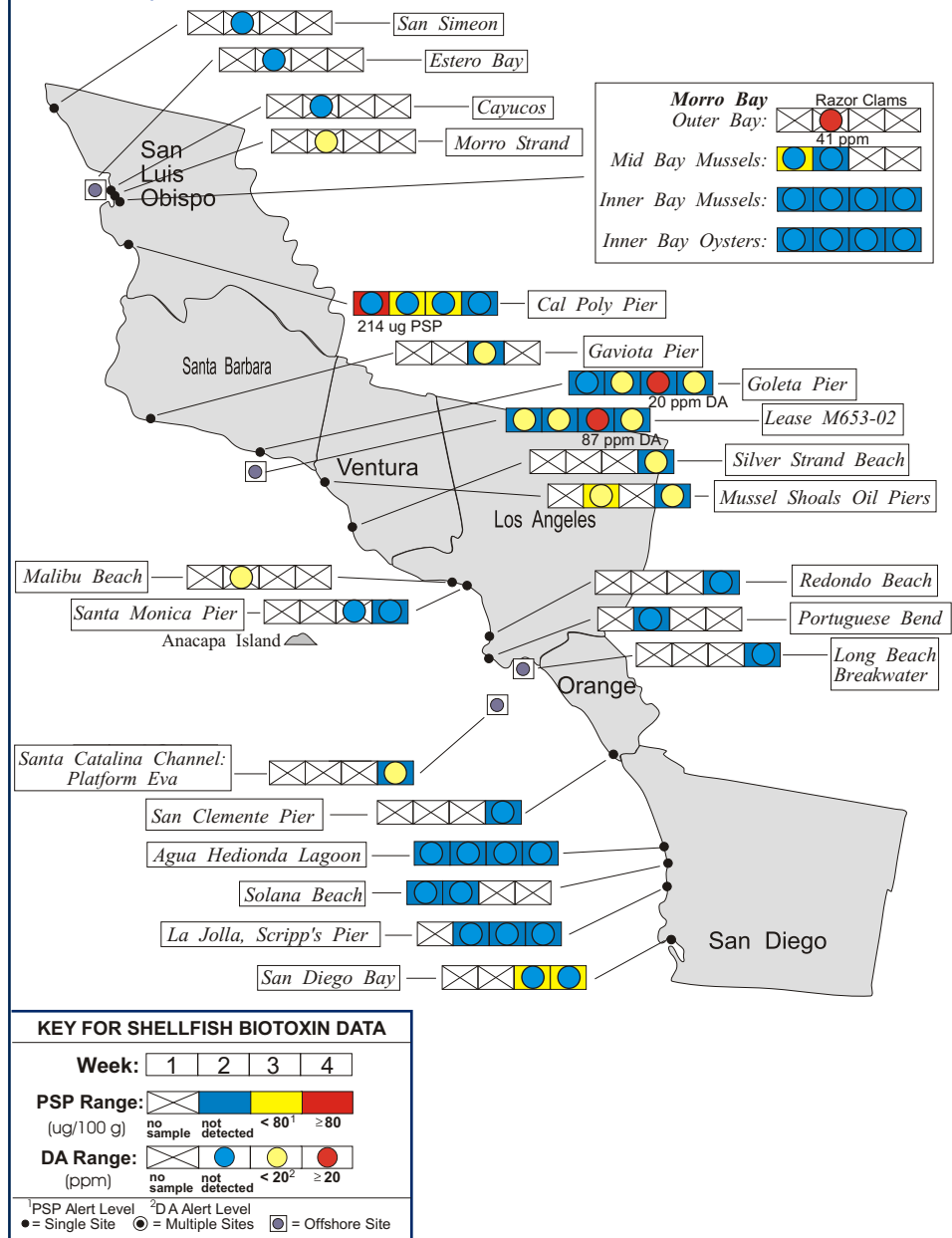
#### MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:

(A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.  
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 3. Distribution of shellfish biotoxins in Southern California during April, 2004.



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Razor clams in Morro Bay reached 41 ppm by April 14. Farther south along the Ventura coast domoic acid concentrations reached 15 ppm in a mussel sample collected on April 13. In addition, a sample of Pismo clams collected by volunteer Bill Weinerth on April 28 contained 10 ppm of this toxin.

Low levels of domoic acid were also detected by mid-month farther south along the Los Angeles coast. Mussels collected at Malibu Beach on April 14 contained 3.7 ppm of domoic acid. By the end of the month this toxin was also detected at a low concentration in mussels from offshore of Orange County (4 ppm on April 28).

#### Environmental Reports

Veterinarians with the DFG reported increasing numbers of sea otter strandings in the Morro Bay region. Although domoic acid was initially suspected, the DFG investigation determined that a protozoan parasite, *Sarcocystis neurona*, was responsible for the majority of otter illnesses and deaths.

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Health Services, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide program designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:  
(510) 412-4635

For Recorded Biotoxin Information Call:  
(800) 553-4133

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### Northern California Summary:

#### Paralytic Shellfish Poisoning

*Alexandrium* was only observed at one site, Bolinas Lagoon (Marin County), in April. PSP toxins were not detected in any shellfish sample.

#### Domoic Acid

*Pseudo-nitzschia* distribution and relative abundance increased at several locations in April (Figure 2). U.C. Santa Cruz reported bloom levels of *Pseudo-nitzschia* at the Santa Cruz Wharf on April 8. This diatom was also observed in high densities at Seacliff Pier (April 14) and Capitola Pier (April 22). Despite the detection of *Pseudo-nitzschia* at the Santa Cruz Wharf in early April, domoic acid was not detected in mussels from this site until April 21 (19 ppm). In contrast, the first detection of elevated numbers of this diatom at Capitola Pier was associated with a high toxin concentration (26 ppm).

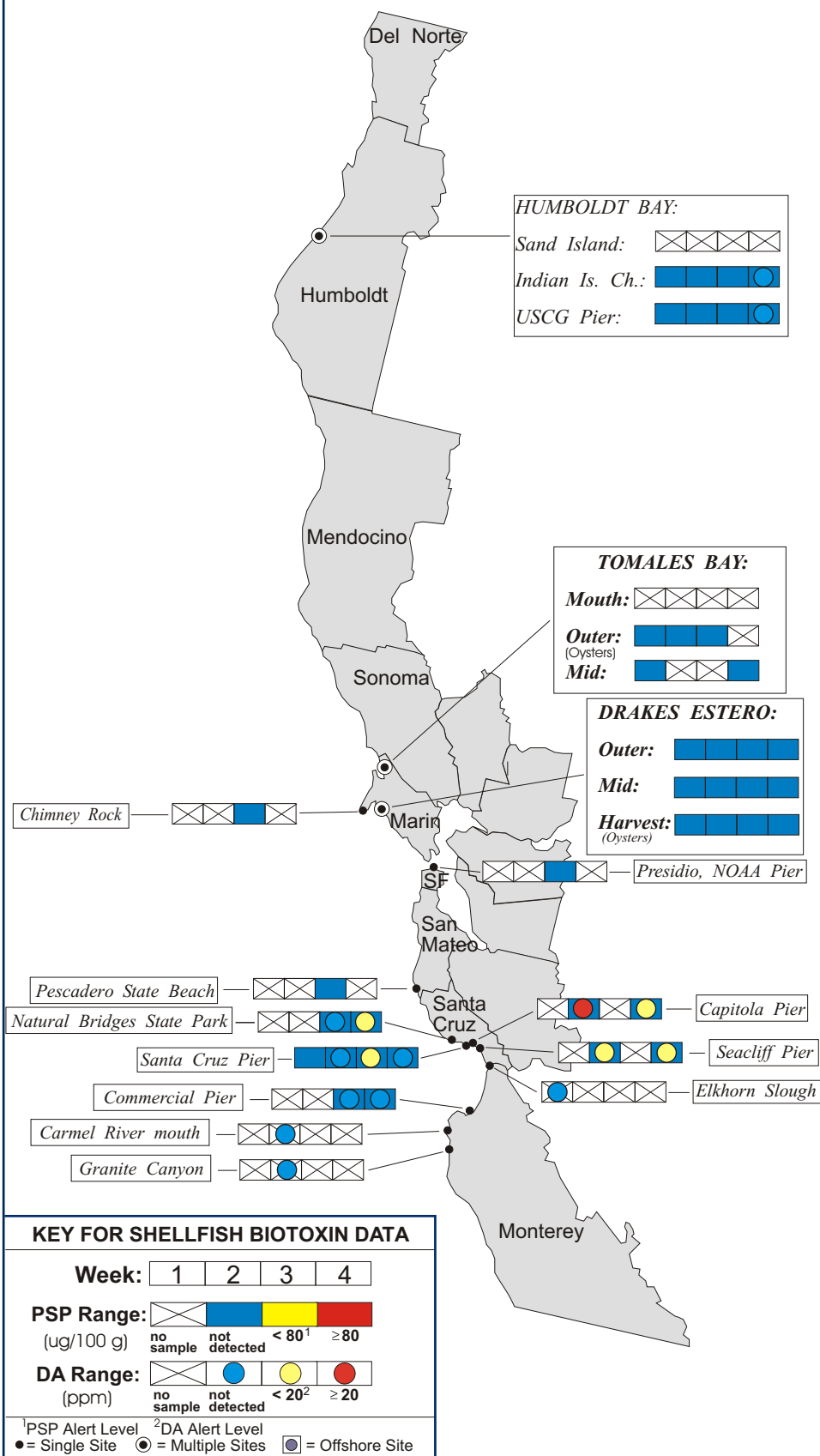
Increasing numbers of this diatom were observed in Humboldt Bay by the end of the month. Domoic acid was not detected in sentinel mussel samples from this region.

#### QUARANTINES:

On April 22 the State Health Director issued a health advisory warning consumers to avoid eating sport-harvested shellfish from Santa Cruz County. This advisory was the result of increasing levels of domoic acid in this region.

The annual quarantine on the sport-harvesting of mussels went into effect on April 23, one week ahead of the normal

Figure 4. Distribution of shellfish biotoxins in Northern California during April, 2004.



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Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during April, 2004.

COUNTY	AGENCY	# SAMPLES
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	8
Mendocino	None Submitted	
Sonoma	None Submitted	
Marin	Hog Island Oyster Company	3
	Johnson Oyster Company	16
	Marin Oyster Company	1
	Cove Mussel Company	2
	CDHS Marine Biotoxin Program	1
San Francisco	San Francisco County Health Department	1
San Mateo	San Mateo County Environmental Health Department	1
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	6
Monterey	CDHS Marine Biotoxin Program Volunteer (Art Seavey)	2
	California Department of Fish and Game	3
San Luis Obispo	Williams Shellfish Company	8
	U.C. Santa Barbara Marine Science Institute	4
	California Department of Fish and Game	16
	Morro Bay Harbor District	1
Santa Barbara	Santa Barbara Mariculture Company	7
	U.C. Santa Barbara Marine Science Institute	4
	California Department of Parks and Recreation	1
Ventura	Ventura County Environmental Health Department	2
	CDHS Marine Biotoxin Program Volunteer (Bill Weinerth)	1
Los Angeles	Los Angeles County Health Department	5
	Aquarium of the Pacific Long Beach	2
Orange	CDHS Marine Biotoxin Program Volunteer (Mike Fennessey)	1
	Ecomar, Inc.	1
San Diego	Carlsbad Aquafarms, Inc.	4
	Scripps Institute for Oceanography	4
	U.S. Navy	2
	CDHS Marine Biotoxin Program Volunteer (Paul Sims)	2

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May 1 start date. This action was taken as a result of elevated levels of domoic acid in Santa Cruz County and, subsequently, along the Santa Barbara coast.

On April 30 an additional health advisory was issued for Ventura, Los Angeles, and Orange counties. This advisory warned the public to avoid eating any species of sport-harvested bivalve shellfish, as well as sardines, anchovies, or the viscera of sport-harvested or commercially sold lobster and crab. This action was taken because elevated levels of domoic acid had been detected in this region.

The annual mussel quarantine, which normally is in effect through October 31, applies only to sport-harvested mussels along the entire California coastline, including all bays and estuaries. This quarantine does not affect the commercial shellfish growing areas in California. All commercial shellfish growers certified by the State of California are required to submit routine samples for biotoxin analysis, allowing us to closely monitor for the occurrence of any toxin. Harvesting closures are imposed if toxin levels reach the federal alert level.

Consumers of Washington clams, also known as butter clams, are cautioned to eat only the white meat. Persons taking any clams or scallops are advised to remove and discard the dark parts (i.e., the digestive organs or viscera).

Contact the "Biotoxin Information Line" at 1-800-553-4133 or (510) 412-4643 for a current update on marine biotoxin activity.





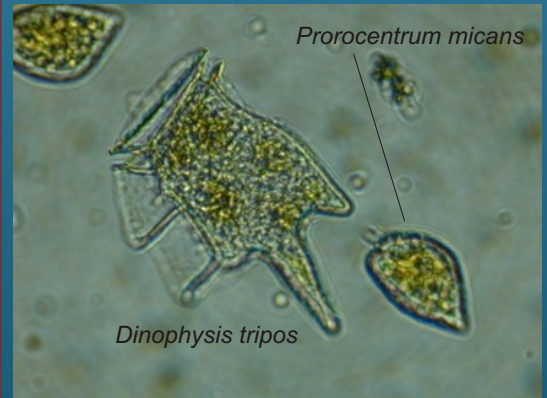
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during April, 2004.

COUNTY	AGENCY	# SAMPLES
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	4
Mendocino	None Submitted	
Sonoma	None Submitted	
Marin	CDHS Volunteers (Brent Anderson, Richard Plant, Marjorie Siegel, Mary Von Tolksdorf)	8
	CDHS Marine Biotoxin Program	1
	Johnson Oyster Company	8
Contra Costa	None Submitted	
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	1
	CDHS Volunteer (Sandy Emerson)	1
Santa Cruz	Santa Cruz Environmental Health Department	6
	San Lorenzo Valley High School	1
Monterey	CDHS Volunteer (Jerry Norbón)	1
San Luis Obispo	CDHS Volunteers (Renee and Auburn Atkins, Richard Welch)	4
	Morro Bay National Estuary Program	5
	Tenera Environmental	3
	U.C. Santa Barbara Marine Science Institute	4
	Morro Bay Natural History Museum	2
Santa Barbara	U.C. Santa Barbara Marine Science Institute	6
	Santa Barbara Mariculture Company	6
	California Department of Parks and Recreation	2
	Santa Barbara City College	1
	Catalina Tall Ships Expeditions	2
Ventura	Ventura County Environmental Health Department	3
	Catalina Tall Ships Expeditions	1
Los Angeles	Catalina Tall Ships Expeditions	2
	Catalina Island Marine Institute	2
	Los Angeles County Sanitation District	3
	Los Angeles County Health Department	3
	Los Angeles Regional Water Quality Control Board	1
	CDHS Volunteer (Richard Weaver)	1
Orange	Orange County Sanitation District	5
San Diego	San Diego County Environmental Health Department	2
	CDHS Volunteer (Paul Sims, Jeff Kermod)	4
	Scripps Institute for Oceanography	2

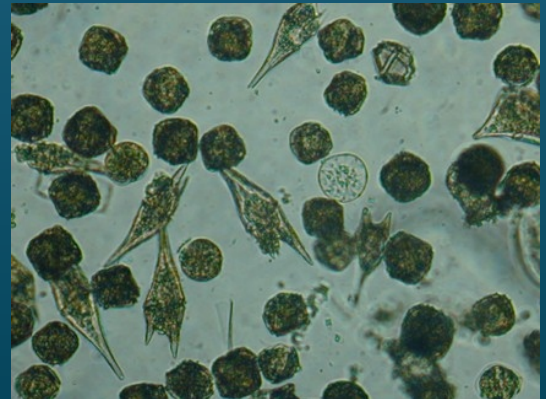
## PHYTOPLANKTON GALLERY



Diatoms like this chain of *Thalassiosira* (and the corkscrew chains of *Chaetoceros* in the background) dominated the assemblage in San Luis Obispo following the decline of *Pseudo-nitzschia*.



The dinoflagellate *Dinophysis tripos* was observed in samples from Orange County.



Dinoflagellates increased in number and distribution along the Southern California coast as *Pseudo-nitzschia* declined. Pictured are *Lingulodinium polyedrum* (dark, round cells) and *Ceratium furca*.